IRCS Medical Science: Biomedical Technology; Environmental Biology and Medicine; Experimental Animals; Microbiology, Parasitology and Infectious Diseases. [*IRCS Med. Sci.*, **12**, 480 (1984)]

Susceptibility of *Diaprepes abbreviatus* to the parasitic nematode *Steinernema glaseri*

J.B. Beavers

U.S. Department of Agriculture, Agricultural Research Service, 2120 Camden Road, Orlando, FL 32803, USA

Paper received: 25th April, 1984

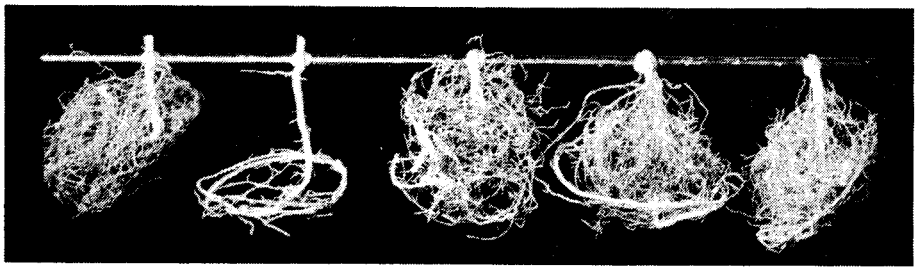
The sugar cane rootstalk borer weevil *Diaprepes abbreviatus* (L.) is a major pest of citrus and sugar cane in Puerto Rico and the West Indies. This pest was found infesting citrus in Florida in 1968 (1) and is presently established in Orange, Seminole, Lake and Broward counties. Although the adult weevil feeds on the foliage, it is the larvae which do the most damage by feeding on the root systems. Due to the restrictions on the use of chlorinated hydrocarbons, there are presently no approved chemicals for larval control of this pest on citrus. This study was conducted in a screenhouse to evaluate the possibility of using the entomogenous nematode *Steinernema glaseri (Neoplectana glaseri)* to prevent the establishment of larval *D. abbreviatus* in potted plants.

Materials and methods: Pots (14 cm high and 15 cm diameter) containing *Citrus* sp. seedlings in Metro-mix 500 growing medium were inoculated with third-stage infective juveniles of *S. glaseri* at rates of 20, 40 and 80 thousand/pot in 50 ml water suspension applied to the soil surface. Control pots were treated with 50 ml water (15 replicates/treatment). Twenty-four hours later, 100 neonate *D. abbreviatus* larvae were placed on the soil surface of each pot. After 8 weeks, the soil was removed from the pots and examined for surviving larvae. The root systems of the test plants and also noninfested control plants were washed, air dried, and weighed after removal from the pots.

The effect of S. glaseri *on larvae of D. abbreviatus 8 weeks after treatment of potted plants*

Dosage (nematodes/pot)	No. larvae recovered/pot (mean ± SEM)	% Population reduction over controls
20 000	1.80 ± 3.1	92.0
40 000	0.13 ± 0.4	99.8
80 000	0	100.0
Control	22.60 ± 13.7	–

Results and discussion: A population reduction of 92% was obtained with the low rate of nematodes (Table). The nematodes were able to develop and reproduce inside the larvae; therefore, it is possible that they would continue their life cycle and leave the insect to infest others. Larval death is due to an associated bacterium, *Xenorhabdus* sp., released in the host by the infective stage nematode (2). Also, there was no significant difference ($p = 0.05$) between root weights of the treatments and the noninfested control. The infested control had significantly greater root loss than all treatments (Figure). The results of this test show that *S. glaseri* has potential as a biological control agent against *D. abbreviatus*.



Root systems of Citrus *sp. seedlings which were uninfested, infested with* D. abbreviatus, *or inoculated with the nematode* S. glaseri *before infestation with* D. abbreviatus.

1. Woodruff, R.E. (1968) *Fla. Dep. Agric. Consum. Serv. Div. Plant Ind. Entomol. Circ.*, 77, 1-4
2. Thomas, G.M. and Poinar, G.O., Jr. (1979) *Int. Syst. Bacteriol.*, **29**, 352-360

IRCS Medical Science: Biomedical Technology; Environmental Biology and Medicine; Experimental Animals; Microbiology, Parasitology and Infectious Diseases. [*IRCS Med. Sci.*, **12**, 480 (1984)]

Susceptibility of *Diaprepes abbreviatus* to the parasitic nematode *Steinernema glaseri*

J.B. Beavers

U.S. Department of Agriculture, Agricultural Research Service, 2120 Camden Road, Orlando, FL 32803, USA

Paper received: 25th April, 1984

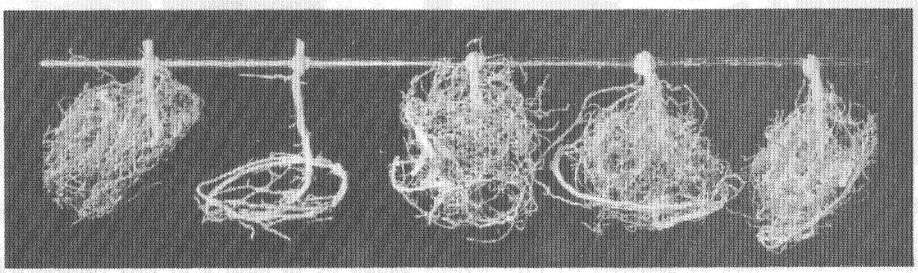
The sugar cane rootstalk borer weevil *Diaprepes abbreviatus* (L.) is a major pest of citrus and sugar cane in Puerto Rico and the West Indies. This pest was found infesting citrus in Florida in 1968 (1) and is presently established in Orange, Seminole, Lake and Broward counties. Although the adult weevil feeds on the foliage, it is the larvae which do the most damage by feeding on the root systems. Due to the restrictions on the use of chlorinated hydrocarbons, there are presently no approved chemicals for larval control of this pest on citrus. This study was conducted in a screenhouse to evaluate the possibility of using the entomogenous nematode *Steinernema glaseri (Neoplectana glaseri)* to prevent the establishment of larval *D. abbreviatus* in potted plants.

Materials and methods: Pots (14 cm high and 15 cm diameter) containing *Citrus* sp. seedlings in Metro-mix 500 growing medium were inoculated with third-stage infective juveniles of *S. glaseri* at rates of 20, 40 and 80 thousand/pot in 50 ml water suspension applied to the soil surface. Control pots were treated with 50 ml water (15 replicates/treatment). Twenty-four hours later, 100 neonate *D. abbreviatus* larvae were placed on the soil surface of each pot. After 8 weeks, the soil was removed from the pots and examined for surviving larvae. The root systems of the test plants and also noninfested control plants were washed, air dried, and weighed after removal from the pots.

The effect of S. glaseri *on larvae of D. abbreviatus 8 weeks after treatment of potted plants*

Dosage (nematodes/pot)	No. larvae recovered/pot (mean ± SEM)	% Population reduction over controls
20 000	1.80 ± 3.1	92.0
40 000	0.13 ± 0.4	99.8
80 000	0	100.0
Control	22.60 ± 13.7	–

Results and discussion: A population reduction of 92% was obtained with the low rate of nematodes (Table). The nematodes were able to develop and reproduce inside the larvae; therefore, it is possible that they would continue their life cycle and leave the insect to infest others. Larval death is due to an associated bacterium, *Xenorhabdus* sp., released in the



Root systems of Citrus *sp. seedlings which were uninfested, infested with* D. abbreviatus, *or inoculated with the nematode* S. glaseri *before infestation with* D. abbreviatus.

host by the infective stage nematode (2). Also, there was no significant difference ($p = 0.05$) between root weights of the treatments and the noninfested control. The infested control had significantly greater root loss than all treatments (Figure). The results of this test show that *S. glaseri* has potential as a biological control agent against *D. abbreviatus*.

1. Woodruff, R.E. (1968) *Fla. Dep. Agric. Consum. Serv. Div. Plant Ind. Entomol. Circ.*, 77, 1-4
2. Thomas, G.M. and Poinar, G.O., Jr. (1979) *Int. Syst. Bacteriol.*, **29**, 352-360